

NEW PEAR BLIGHT DISINFECTANT DISCOVERED BY REIMER PROVES EFFACIOUS IN CHECKING DISEASE

Cyanide of Mercury Prevents Spread of Blight in Wounds of Tree but Corrosive Sublimates Must Still Be Used for Cutting Instruments.

(By F. C. Reimer, Southern Oregon Experiment Station, Talent Ore.)

It is generally known by pear growers that the only way to eliminate pear blight (bacillus anovorvus) from an infected tree is to cut out and destroy all the infected parts of the tree. It is also well known that in cutting out and through these infected portions often many blight bacteria are smeared over the tools used in the work. Furthermore, that when the final cuts are made in the clean healthy bark some of the bacteria on the tools are again smeared over the healthy surface. In many cases new infections are made in this manner, and the disease continues to spread from the margins of the wound. For this reason a disinfectant should be applied to destroy any bacteria that may thus have been left on the surface of the wound. The only disinfectant that has been generally recommended and widely used for this purpose is corrosive sublimate (bichloride of mercury.) This is a powerful disinfectant, and has been extensively used in the past by medical men.

It has often been noted where the blight cankers have been removed and corrosive sublimate has been applied that the disease would continue to develop, especially during favorable weather conditions. This has generally been attributed to a lack of thorough work leaving some blighted tissue in the margin of the wound. It is certain that this has been responsible for such continued development of pear blight in many cases.

However, often pear blight would continue to develop from such wounds where the most thorough cutting possible had been done. For this reason it was suspected that possibly corrosive sublimate was not always destroying all the bacteria left on such wounds. Hence, experiments were started in June of this year to test corrosive sublimate and other chemicals as disinfectants for pear blight germs on the wounds of pear trees.

For this experiment a large number of uniform and very vigorous three-year old Bartlett pear trees were selected. These were entirely free from pear blight when the experiment was started. On the trunk of each tree two large wounds were made, removing the bark and exposing the sapwood over the entire wound. Blight bacteria were then smeared over the surface of each wound, especially over the margins so that most of the bacteria were deposited on the cut surface of the margin of each wound. All the bacteria used came from one blight culture so as to give uniformity. Immediately after applying these bacteria the disinfectants were applied covering the entire wound thoroughly with the disinfectant by means of a new, clean paint brush. For each disinfectant a separate brush was used. The following disinfectants were used, treating with two exceptions eight trees, or sixteen wounds with each disinfectant: Bordeaux paste, corrosive sublimate 1 to 500, Cresol 5 per cent, cyanide of mercury 1 to 500, lime sulphur 10 per cent, "Black Leaf 40" 5 per cent, Chloroxene 1 to 500. Eight trees were used as checks to the wounds of which the bacteria were applied, but no disinfectant was used.

The results of this experiment were rather startling. Every wound treated with corrosive sublimate, bordeaux paste, cresol, lime sulphur, black leaf 40, and chloroxene, developed a vigorous case of pear blight. The corrosive sublimate was used twice as strong as is generally recommended for this purpose, and the brands used are manufactured by some of the largest chemical firms in this country. The bordeaux paste was made by dissolving 1 pound of bluestone in a gallon of water, and two pounds of lime in one gallon of water, and then mixing the two. The Cresol used was the honor cresolis compound. The lime sulphur was one of the best known commercial brands and tested 32 Baume. The chloroxene is a new disinfectant now extensively used in treating human wounds.

It is well known that corrosive sublimate is a very powerful disinfectant under certain conditions. In pure water cultures it will readily kill most bacteria in a comparatively short time when used at a strength of 1 to 1000. It has been known for many years that its value is impaired by organic matter, and especially by albumins. Under these conditions it forms inert combinations and its value as a disinfectant is largely destroyed. This probably explains our results with this material on the wounds of pear trees which are largely composed of organic matter.

Results With Cyanide of Mercury.
The treatment with cyanide of mercury, in the above experiment, proved very effective. Not a single wound treated with this material developed blight. In this experiment we used the pure cyanide of mercury to 500 grains of water. It is quite remarkable that with all the other treatments every wound developed blight while where the cyanide of mercury was

used not the slightest indication of the disease could be found. The margins of the wounds showed some injury from the cyanide of mercury treatment. This injury was confined to a narrow strip of bark around the wounds, and was of no material importance as the cambium soon started to push out from underneath the injured bark and continued to grow over the wound just as it does in normal wounds where no injury has been produced.

Further Experiments
These results were regarded of such importance that the work was repeated on Bartlett, Anjou, Howell, Comice, Bose, and Winter Nelis. In one series a bouillon blight culture was used, while in the other series the typical blight ooze from badly blighted pear trees was used. In some of these later experiments the disinfectants were used at the same strengths as in the first experiment, while in others different strengths were tried. In all cases where the cyanide of mercury was used at a strength of 1 to 500 not a single case of blight developed. With the exception of a few wounds on trees making a very slow growth all of those treated with corrosive sublimate, cresol, bordeaux paste, lime sulphur, and black leaf 40, again developed blight.

In all of the earlier experiments we used the pure cyanide of mercury and distilled water. The disinfectant was prepared fresh each day and carried in glass receptacles and applied with an ordinary clean paint brush. Two drops of blight ooze were applied to each wound to make the test a severe one.

Experiments are now in progress to determine whether the cyanide of mercury tablets are as effective as the pure cyanide of mercury; and whether hard water, metal receptacles and a sponge impair their effectiveness. Preliminary results indicate that the tablets are effective.

Cyanide of Mercury at Other Strengths

In the later experiments it has been found that cyanide of mercury is not always effective when used at a strength of 1 to 1000. While some of the wounds on which this strength was used did not develop blight in a number of cases the disease did develop. Hence, it is not safe to use this material at this weak strength. Experiments will be conducted to determine the weakest strength that will be effective in all cases.

Experiments have also been conducted to determine what strength of cyanide of mercury causes injury on the wounds of pear trees. It has been found that a strength of 1 to 300 causes severe injury. For this reason it should not be used stronger than 1 to 500.

Cyanide of Mercury Not Effective on Tools

Experiments have also been conducted to determine the value of cyanide of mercury as a disinfectant for the metal tools used in blight control work. The results have been surprising to say the least. A drop of blight ooze was smeared over the blade of a steel knife which was then immersed in the cyanide of mercury (1 to 500) solution. A cut was then made with this knife through the bark and cambium of a clean healthy pear branch. This operation was repeated many times, treating the knife with a drop of ooze and immersing it in the disinfectant each time before a new cut was made. In most of the cuts no blight developed, but in a small percentage of cases the disease did develop. It is evident that this disinfectant is not a safe one to use on tools. This is unfortunate but nevertheless true.

Another surprising and remarkable result was obtained with corrosive sublimate (bichloride of mercury) as a disinfectant for metal tools. The above experiment was duplicated using corrosive sublimate at a strength of 1 to 500 as the disinfectant. Not a single case of blight developed where this material was used.

To summarize: Cyanide of mercury 1 to 500 is effective on the wounds, but not effective on metal tools; and corrosive sublimate is not effective on the wounds but effective on the tools.

It is evident that if the cyanide of mercury is applied to every wound—whether a wound from which blight has been cut or simply a wound made in healthy bark in probing for blight—it will prove effective. In other words it will destroy blight bacteria left on the surface of the wound by the tools. If the blight cutter wants to disinfect his tools also, and this is preferable, he should use the corrosive sublimate for that purpose; and the cyanide of mercury for the wounds. While this procedure will

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prove thoroughly effective the carrying and use of two solutions is cumbersome and not relished by the average blight cutter.

It is evident that another disinfectant should be found which will be effective on both the wounds and the tools. A search is now being made for such a disinfectant.

It is interesting to speculate on why the cyanide of mercury is effective on the wounds but not on the knife, while the opposite is true of the corrosive sublimate. The following suggestions are worth considering in this connection. The cyanide of mercury may form a chemical compound with the metal when placed on tools which destroys its effectiveness as a disinfectant. Or it may be effective on the wound simply because it modifies the plant tissues—by injury or otherwise—making it impossible for the bacteria to develop and enter the normal tissues beyond. The corrosive sublimate, as has already been discussed, probably becomes ineffective in the presence of the organic matter in the wound. On metal tools, in the absence of organic matter, it is effective.

A Promising Disinfectant
In our experiments a number of disinfectants have been tried, and most of them have proved ineffective. With some, unfortunately, not sufficient work has been done to draw final conclusions. One of these appears quite promising and is well worthy of further work. This is formaldehyde, also known as formalin. Experiments have been conducted to determine the value of formaldehyde as a disinfectant for both the wounds and tools. It was used at strengths of 4, 7, and 10 per cent. In these tests the four percent strength proved effective in all cases as a disinfectant for the tools. The other strengths were not tried on the tools, but undoubtedly the 7 and 10 percent would be effective.

All of these strengths were tried on the wounds of pear trees. The 4 percent and 7 percent strengths proved effective in many cases, but developed blight in a few cases. Hence these strengths cannot be recommended. The 10 percent strength has proved effective in all these tests; as developed where this strength was used. Wounds treated with corrosive sublimate at the same time developed the disease.

These tests with formaldehyde were not started until midsummer, hence the results cannot be considered final. It is well known that a pear tree usually will not blight as readily after midsummer as during the spring and early summer, due to the great amount of sap and more succulent growth early in the season. Next season we shall repeat the experiment at the most critical time, and I reserve final conclusions until that time.

While the findings cannot be considered final the writer considers formaldehyde as an extremely promising disinfectant for blight control work. If it proves effective during the most critical season of the year it will be even more desirable than cyanide of mercury as it can be used on both wounds and tools. The writer feels that a 10 percent solution of formaldehyde can be safely recommended for both tools and wounds in blight work during the fall and winter months. The commercial formaldehyde commonly sold by druggists—40 percent strength—was used in this work. A 10 percent strength in this discussion means 1 part of commercial formaldehyde mixed with 9 parts water. This

Y. M. C. A. WANTS MEN FOR WORK IN FOREIGN LANDS

The Y. M. C. A. Personnel committee for Medford and vicinity have received word of the urgent need of men for that work overseas. Five thousand men are needed at once and those interested in that line of service are urged to give the matter immediate attention. A recent cable asks for 40 men for the French army and 1000 for the Italian troops. The need right now is greater than when active fighting was going on.

The latest advice concerning men who may go home from New York this week. "Men 37 or older September 12th may be approved for overseas and secure passport without draft classification or permit to leave the country. Men 32 to 37 deferred classifications may now be recruited, but need permit to leave country."

Owing to the fact that troops are not being sent to the home camps, we will not want to recruit men for domestic service. Exceptional men may however be considered for this service.

Men of this locality who are interested are urged to make application to the local Personnel committee consisting of J. C. Mann, George R. Lindley, E. N. Warner, H. E. Marsh and L. Myron Boozer.

WIRE SERVICE CONSOLIDATED

(Continued from page one.)

interruption or impairment of service to the public.

Cooperation Asked
I earnestly request the loyal cooperation of all officers, operators and employees, in order that the service rendered shall not only be maintained at a high standard, but improved wherever possible. It is the purpose to co-ordinate and unify these services so that they may be operated as a national system with due regard to the interests of the public and the owners of the properties.

"No changes will be made until after the most careful consideration of all the facts. When deemed advisable to make changes, due announcement will be made. "Nothing contained in this order shall be construed to affect in any way the censorship of marine cables now conducted under the direction of the secretary of the navy under executive order of September 26, 1918."

strength causes noticeable, but immaterial, injury to the margins and surface of the wound.

At this season of the year in his regular blight control work in the Station orchard the writer is using 10 percent formaldehyde, for both wounds and tools. Next spring and early summer he will use cyanide of mercury on the wounds until experiments have decided whether formaldehyde is effective at that critical season. I must repeat that it is thoroughly effective at all seasons of the year, and where every wound, cut, and scratch made by the tools is disinfected with this material, it will prove entirely effective.

IRWIN TREATED AS OFFICER'S GUEST AMONG MISSING

Lost, Strayed or Stolen—One Fred Irwin, weight about 135 pounds height about 5 ft. 6, not branded, light gray suit, when last seen was going north.

This is the young man that Constable Chapman brought from Eugene, and as he found him running loose, he thought that he was perfectly tame, so when he arrived in Medford he entertained him at his home, refusing to take him to the county jail.

The charge against Irwin is beating a hotel bill. He appeared before Justice Taylor Tuesday morning and hearing was set for two o'clock yesterday afternoon. As he complained of not feeling well, and not fully having recovered from an attack of the influenza, Constable Chapman took him to his home again, and left him there to enjoy himself while he went to the country to serve some papers. When lunch time neared, the young man told Mrs. Chapman that he would go up town and get some oysters for lunch. He is still going, probably not being able to locate any on the street that were strictly fresh, decided to go up to Puget Sound where they grow. He may have had another attack of the flu and forgot to notify his friends where he is located.



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